266495

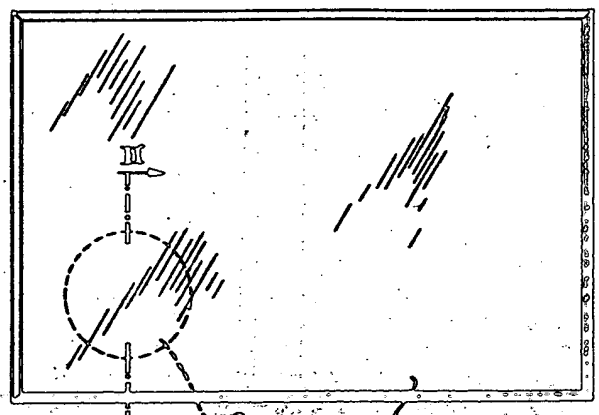

FIG 1.

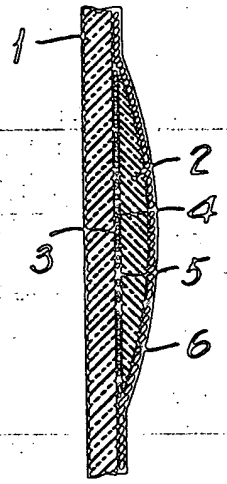

FIG 2.

The Claims defining the invention are as follows:-

1. A plano mirror having a portion thereof capable of reflecting a magnified image, comprising a flat glass plate having a plano-convex lens cemented at its plano side to a selected portion of the back surface of the plate, and a reflecting layer covering the back of the plate and convex side of the lens. (18-10-1962)

2. A mirror as claimed in Claim 1, wherein said plano-convex lens is colourless. (18-10-1962)

3. A mirror as claimed in Claim 1 or 2, wherein said plano-convex lens is made of glass or a transparent synthetic resin. (18-10-1962)

4. A mirror as claimed in Claim 1, 2 or 3, wherein the radius of curvature of the convex side of said plano-convex lens is 50 to 100 cm. (18-10-1962)

5. A mirror as claimed in Claim 1, 2, 3 or 4, wherein said plano-convex lens is cemented by means of an adhesive which consists of synthetic resin or cellulose derivative. (18-10-1962)

6. A mirror as claimed in Claim 5, wherein the adhesive consists of epoxy resin and 6 - 10% polyamine hardening agent. (18-10-1962)

7. A mirror as claimed in any one of the preceding Claims, wherein the reflecting layer is covered with a protective coating. (18-10-1962)

8. A mirror constructed substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

(18-10-1962)

Dated this 4th day of March, 1966.

AZEGAMI GLASS MIRROR MANUFACTURING CO., LTD.
By their Patent Attorney

George H. Frazer

of GRIFFITH, HASSEL & FRAZER
(Fellow, Institute of Patent
Attorneys of Australia)

power will almost reach to $1 + \frac{50n}{r}$ (wherein n represents the index of refraction of glass and r is radius in cm. of convex curvature), viewed from a distance of 25 cm. (the distance of distinct vision), whereas that of a simple concave mirror is only $1 + \frac{50}{r}$.

In order to enable the present invention to be more readily understood, reference is now made by way of example to the accompanying drawings in which:

Fig. 1 is a plan view of the whole mirror showing an embodiment of the present invention.

Fig. 2 is an enlarged sectional view taken on the line II - II in Fig. 1.

In assembling the mirror of this invention, a plano-convex lens 2 is cemented at its plane side 4 to a selected portion of the back-side 3 of a flat glass sheet 1 by means of an appropriate adhesive as hereinbefore set forth, in which case to a flat surface 4 of the plano-convex lens 2, the above described adhesive is applied to form an adherent film layer, and then the coated surface is put on the back-side 3 of the flat glass sheet 1 and the lens is pressed against the said back-side to squeeze out any entrapped bubbles therebetween. 5 represents the adhered layer of the adhesive between the flat surface of the lens 2 and the back surface 3 of the flat glass sheet 1. Thus, back surfaces are firmly cemented together after being allowed to stand in the pressed condition. Thereafter, a reflex layer 6 is formed on the whole back-side of the assembled unit in any one of manners as hereinbefore set forth.

with 110-130 cc. of 20-30% ammonia water, then the mixture is strongly shaked until any deposition disappears. Thereafter, the solution is diluted by 2 litres of distilled water.

Solution B:

35-50 g. of caustic potash and a small amount of ammonia water are dissolved in 90-110 cc. of distilled water, and then the solution is diluted by 2 litres of distilled water.

Solution C:

15-25g of glucose is dissolved in 90-110 cc. of hot water, and then the solution is diluted by 2 litres of distilled water.

In the case of the vacuum evaporation, for example, of aluminum, a vacuum evaporation tank is used in which a tungsten filament is arranged against the glass surface to be treated. An aluminum wire of 99.99% purity is mounted on the filament. Thereafter, the tank is evacuated upto a high vacuum of 10^{-3} to 10^{-5} mmHg. and an electric current is applied to the filament, thereby the aluminum wire is evaporated and coats the glass surface to form a reflecting layer.

Further, the reflecting layer thus formed may be coated with a protecting layer of silicon resin, fluoro carbon resin, or any other metal protecting coating.

In the mirror of the present invention, the flat mirror portion reflects an image of the same size as the object, similarly to a conventional mirror. At the plano-convex lens portion, the metallic reflecting layer formed on the above described convex side of the lens forms a concave mirror surface, and the plano-convex lens effects a converging action, so that the reflected beams of light from the reflecting surface are converged by this lens and its image is further magnified. Consequently, the convex lens in the present invention has an effect far greater than the magnification of a simple concave surface reflection of the same curvature. The magnifying

shaped into the form of a lens by simple pressing and polishing procedures. One side of the plano-convex lens is a flat surface and the other side is in the convex form of a suitable curvature, preferably of 50 - 100 cm. in radius.

As an adhesive is used such an adherent agent as that made of synthetic resin or cellulose derivative, which is able to form an adherent transparent layer. Preferably, an epoxy resin-type adhesive, especially an adhesive mixture of epoxy resin and 6 - 10% polyamine hardening agent, such as a mixture of an epoxy resin " Bond E " (trade name) and a hardening agent " Bond A_2 " ; " Epon 6 "; and " Araldite " (trade names), all of which are available commercially.

The formation of the desired reflex layer can be carried out by any one of usually known processes, such as a process by chemically depositing silver from silver nitrage solution, or a vacuum evaporation, or sputtering process for metal such as aluminum, silicon, or tin.

In the case where the former chemical method is to be applied, the flat glass sheet, to which back side the plano-convex lens is cemented, is first washed by 1 - 2% stannous chloride and distilled water. Thereafter a mixture containing equal quantities of the following three solutions is poured at three times over the glass surface to form the reflecting layer :

Solution A :

40 - 60 g. of silver nitrate is slowly mixed

The mirror of the present invention is characterized in that a transparent plano-convex lens is cemented at its plane side to a selected portion of the back surface of a flat glass plate, and then the back surface and the convex side of the lens are covered with a reflecting layer. As described above, the mirror according to the present invention, is formed integrally with two parts, one of which reflects a non-magnified image similar to that in the conventional mirror and the other is able to form a magnified image.

Further, in the present invention, there is no need to use a blank glass sheet of large width as in the case of a flat mirror provided with a concave portion since the blank glass sheet is neither cut nor is ground to form a concave portion, and therefore any sheet glass can be used as a blank flat glass sheet if such glass sheet is polished on its both surfaces. Accordingly, the mirror of this invention can be made light in weight and the cost is relatively inexpensive.

The plano-convex lens in the present invention can be made from glass or other suitable transparent synthetic resin such as methacrylic resin or polystyrene resin. These resin materials can easily be

266495
23,336/62.

COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION

		Class	Int. Cl.
Application Number	23,336/62	00.4.	G02b.
Lodged	18th October, 1962.		

Complete Specification Entitled A MIRROR PROVIDED WITH AN IMAGE-MAGNIFYING PORTION THEREON.

AUSTRALIA
DIV. 250
Cl. 88
350

Lodged 18th October, 1962.
Accepted 6th April, 1966.
Published 23rd April, 1964.

Convention Priority -

Applicant AZEGAMI GLASS MIRROR MANUFACTURING CO. LTD.

Actual Inventor KEIJI AZEGAMI.

Related Art: 225,866(34,311/58) 00.4.

The following statement is a full description of this invention, including the best method of performing it known to us :

Printed for the Government of the Commonwealth by A. J. Arthur, Commonwealth Government Printer, Canberra

87-1D-5/5/66.

The present invention relates to a mirror provided with an image-magnifying portion thereon and, more particularly, to a mirror provided on a selected part of its back-side with a portion capable of forming a magnified image.

It has already been known to provide a concave portion on a suitable part of the glass surface of a conventional glass plate mirror, so that a magnified image may be formed through this portion. Such mirror is very convenient in that one can obtain a locally magnified image and a non-magnified image on a single mirror. However, the provision of such concave portion on a part of a flat glass plate not only requires very difficult cutting and grinding techniques and consumes a considerable time and labours, but also tends to cause the breakage of the glass blank in the course of the processing. As a result, it was impracticable to make such a mirror economically on a commercial scale.

The present invention has for its object to overcome such defects and disadvantages as described above and to provide an improved mirror provided with an image-magnifying convex lens in such a manner as to enable the mirror to be simply and inexpensively manufactured on a commercial scale.

Another object of this invention is to provide economically a mirror which is made by cementing flat surface of a colourless and transparent plano-convex lens to a suitable part of the backside of a flat glass sheet and forming a reflex surface, acting as a mirror layer, over the whole back-side area of the assembled unit.

Other objects, features and advantages will be apparent from the following description.

THIS PAGE BLANK (USPTO)